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(12) UK Patent Application (19) GB (11) 2 030 669 A

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(21) Application No 7930923

(22) Date of filing 6 Sep 1979

(23) Claims filed 6 Sep 1979

(30) Priority data

(31) 7809245

(32) 11 Sep 1978

(33) Netherlands (NL)

(43) Application published

10 Apr 1980

(51) INT CL<sup>3</sup>

F16L 21/02 B29C 27/16

(52) Domestic classification

F2G 21A

B5A 1R214H 1R314C5

1R429B 20T14 20T3 B18

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(58) Field of search

F2G

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(54) A pipe socket part with an in situ cast and moulded retaining ring.

(57) The invention relates to a pipe socket 2 of thermoplastics material provided with a seal 8 comprising a

head part and a sleeve part 7, the head part being retained by a retaining ring 10 formed in position by polymerizing a polymerisable polyurethane composition *in situ*, within a mould located at the mouth of the socket.

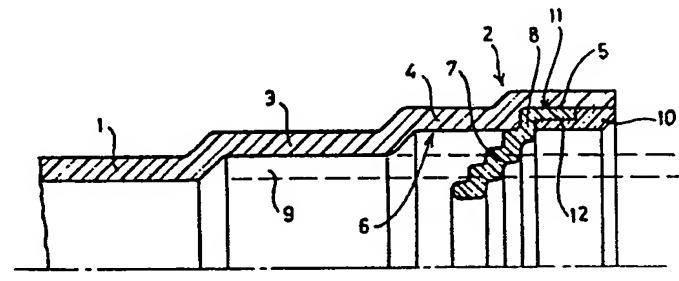


FIG:1.

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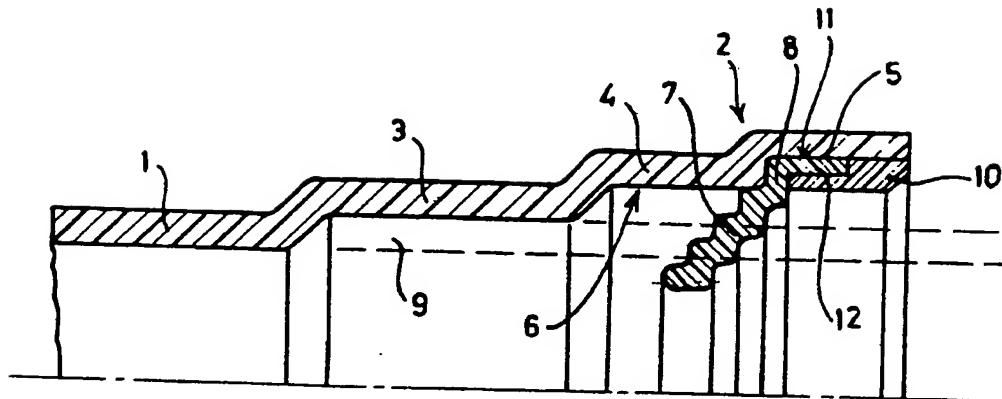


FIG:1.

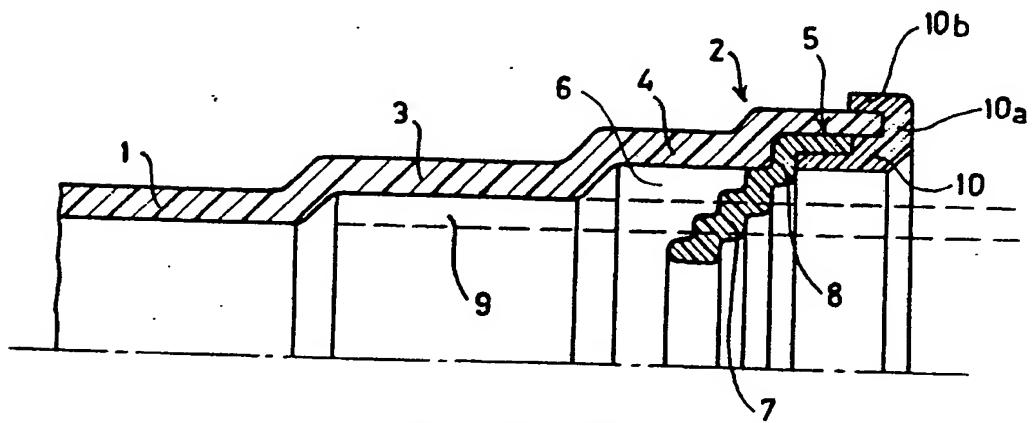


FIG:2.

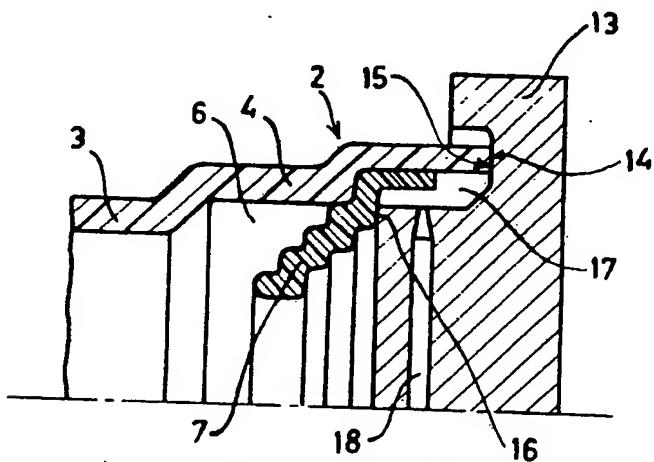


FIG:3.

**SPECIFICATION****A pipe socket part with an in situ cast and moulded retaining ring**

The present invention relates to a pipe socket part provided with a retained elastic sealing member.

A pipe socket part of this type, provided with an elastic sealing member, is known. In said known pipe socket part, the elastic sealing member is glued to the inner side of the pipe socket part by means of filler glues.

Such a pipe socket part is inappropriate, as the annular filling glue layer between the inner side of the pipe socket part and the opposite side of the sealing member, will give rise to leakages.

A further disadvantage is that in forming a joint, a male pipe part will press against the sealing member, causing the glue layer to be seriously damaged, so that leakages will follow therefrom.

At last, when forming a pipe joint with said known pipe socket parts, the male pipe part can difficultly be guided during inserting same, due to the lack of guide means in the mouth of the pipe socket part.

The present invention aims to provide a pipe socket part, which overcomes the abovementioned problems.

This object is attained in accordance with the invention in that the elastic sealing member is retained by a moulded plastics retaining ring formed in situ by casting a polymerisable plastics resin composition which has been polymerized in its position.

A pipe socket part of the abovementioned type is very advantageous as the formed retaining ring provides a guide for the male pipe part to be inserted, whilst on the other hand, glues for retaining the sealing member can be omitted. The enclosure of part of the sealing member, further causes said sealing member to be optimally retained.

By casting and moulding in situ of a polymerisable composition consisting of simple monomers, said retaining ring serving for retaining the elastic sealing member can be easily produced. The retaining ring is preferably formed in situ by casting substances being able to polymerize to a solid plastics at low temperatures, preferably at room temperatures.

The use of such a retaining ring presents the advantage that by a suitable selection of the polymerisable monomers and the way of polymerisation, a polymerisation may take place without involving high temperatures, so that the part of the elastic sealing member cooperating with the retaining ring, will not be impaired. If high temperatures should occur during polymerisation of the plastics retaining ring, this would require an elastic sealing member of an elastomeric material being resistant to high temperatures, which would considerably increase the expenditures and which, on the other hand, is not a prerequisite for forming a joint by using such a main pipe part.

Especially by using a cold polymerisable

polyurethan composition, on the one hand a rigid retaining ring is produced, whilst on the other hand no special precautions need be taken with respect to the temperature resistance of the material of the elastic sealing member.

Furthermore, a very good joint is then obtained between the pipe socket part, a rubber sealing member and the retaining ring.

The retaining ring expediently extends into the inner side of the socket and beyond the free end of the socket as then a simple mould suffices for moulding the retaining ring in accordance with the invention, in an uncomplicated manner.

If desired, the retaining ring may enclose the free end of the socket and may extend across the inner side and the outer side of the socket.

The pipe socket part in accordance with the invention should preferably comprise a chamber for accommodating a sleeve-shaped sealing sleeve, being connected with the head of the sealing member which is retained by the retaining ring.

Preferably, the retaining ring has been cast after having positioned the sealing member so as to obtain an optimum cooperation between the sealing member and the retaining ring.

The invention in another aspect relates to a method of accommodating a sealing member in a pipe socket part, said sealing member being retained in said pipe socket part, which result is obtained by casting and moulding in situ a polymerisable plastics composition after having positioned a part of the sealing member in an annular recess. Said moulding process will cause a rigid retaining ring to be formed for retaining the sealing member.

The retaining ring is preferably formed by casting a polymerisable composition which is polymerized in its final position; in this connection the wording casting comprises moulding, but also injection moulding of the liquid or flowable polymerisable composition.

The polymerisable composition in accordance with the invention preferably consists of substances which are able to polymerize at low temperatures, said polymerisable composition particularly being a polyurethan resin. A polyurethan resin-forming-composition is preferably used, which can be cold polymerized.

In the preceding part polymerisation applies to each manner of connecting monomers with one another by using all polymerisation technics known per se.

It is to be noted that retaining rings for retaining a sealing member, are known. Said retaining rings consisting of polyvinylchloride, polyethylene or polypropylene, present a cross-sectional J-shape or a U-shape, and are applied thus, that one leg of the retaining ring cooperates with the outer side of a pipe socket part. This known construction presents the disadvantage that the manufacture is very expensive as the pipe socket part has to be provided with an adapted inner surface, in such a manner, that the retaining ring can still be relatively axially displaced, when said retaining

ring vigorously impacts the bottom.

In a further known construction, said retaining ring is entirely accommodated in the inner side of the socket pipe part. However, prior to 5 accommodating said retaining ring, the inner surface of said socket pipe part has to be provided with certain profiled sections which also holds for the outer side of the retaining ring, which has to cooperate with the profiled sections of the socket 10 pipe part. The latter embodiment is not attractive, due to high labour expenditures.

As already described hereinbefore, the present invention overcomes all the latter problems and offers a pipe socket part including a moulded 15 retaining ring for retaining an elastic sealing member, which can be manufactured cheaply, due to its simple and yet efficient construction.

The invention will now be illustrated by means 20 of an embodiment with reference to the accompanying drawings, in which:—

Figure 1 shows a first embodiment of a pipe socket part in accordance with the invention, comprising a moulded retaining ring;

Figure 2 shows a further embodiment of a pipe 25 socket part in accordance with the invention, comprising a moulded retaining ring in accordance with Figure 1, and

Figure 3 shows a pipe socket part with an elastic sealing member and a mould employed for 30 forming a retaining ring.

Figure 1 shows a pipe 1 of polyvinylchloride comprising a socket part 2. Said socket part 2 comprises a first widening 3, a second widening 4 and a final widening 5, said final widening 5

35 having an inner diameter exceeding that of the second widening 4, whilst on the other hand said second widening 4 has an inner diameter exceeding the inner diameter of the first widening 3. By means of the second widening 4 a chamber

40 6 is formed wherein a sleeve-shaped sealing sleeve 7 of an elastic sealing member 8 may be accommodated, said sealing member 8 effecting a seal with a male pipe part 9, illustrated in broken lines in Figure 1. The free extreme end of the male pipe part 9 is inserted into the first widening 3 of the socket 2.

The pipe socket part in accordance with the invention further comprises a retaining ring 10, said retaining ring 10, together with the final 50 widening 5, forming a chamber 11, wherein a head 12 of the elastic sealing member 8 is accommodated. Said retaining ring 10 consists of a polyurethan ring, which is obtained by casting and moulding a cold polymerisable composition of

55 polyols, with diisocyanates. The expression cold polymerisable resin composition is to be understood as a resin composition being able to polymerize at ambient temperature or at lower temperatures. By suitably selecting said 60 composition said retaining ring 10 may therefore be formed in situ by polymerising said composition at lower temperatures, such as normal room temperature.

By appropriately selecting the polymerisable 65 composition, the polymerisation can be effected at

low temperatures, so that no special precautions as regards the material to be used for the elastic sealing member 8, need be taken. Actually, each normal rubber or each elastomeric material may now be used.

Obviously the retaining ring may also be cast and moulded by using initially plasticized prepolymers and by subsequently forming the retaining ring 10 in situ by curing said pre-polymers.

70 75 However, in the latter circumstances the elastic sealing member should consist of elastomeric material being resistant to high temperatures.

In Figure 1 the retaining ring is applied in such a way that it extends completely on the inner side of 80 the final widening 5 of the socket pipe part 1.

Figure 2 shows a further embodiment, but the retaining ring 10 is now provided with an end part 10a, and an outer part 10b, thus that the retaining ring 10 extends by means of part 10b across the 85 outside of the socket, whilst on the other hand, the free end of the socket is protected by part 10a of the retaining ring 10. Said retaining ring 10 with its matching parts 10a and 10b, is obtained in the same way as described for Figure 1, to wit by 90 moulding a polymerisable composition of diisocyanates and polyols.

Figure 3 shows a socket pipe part 1, with the socket part 2 and a mould 13.

Said mould 13 comprises a surface 14 95 engaging the free end surface 15 of the socket pipe part 2. Moreover, said mould 13 comprises a surface 16, which cooperates with part of the elastic sealing member 8. In the space, formed between the inner side of the third final widening 100 of the socket part 2, the inner side of the mould 13 and the surface 16 by which the mould cooperates with the elastic sealing member 8, a chamber 17 is formed, said chamber 17 being filled by casting the polymerisable composition 105 into a channel 18, said polymerisable composition consisting of a cold polymerisable polyurethan composition. After polymerisation at room temperature, said composition provides the desired rigid retaining ring 10 for retaining the 110 elastic sealing member 8.

#### CLAIMS

1. A pipe socket part comprising a retained elastic sealing member, wherein the elastic sealing member is retained by a moulded plastics retaining ring formed in situ by casting a polymerisable plastics resin composition which has been polymerized in its position.

115 2. A pipe socket part as claimed in claim 1, wherein the retaining ring is formed in situ by casting and moulding substances being able to polymerize to a solid plastics at lower temperatures, preferably at ambient temperature and preferably a polyurethan resin.

120 125 3. A pipe socket part as claimed in any or more of the preceding claims, wherein the retaining ring extends into the inner side of the socket and the retaining ring preferably encloses the free end of the socket and extends across the inner side and the outer side of the socket.

4. A pipe socket part as claimed in any or more of the preceding claims, wherein the socket comprises a chamber for accommodating a sleeve-shaped sealing sleeve, which is connected with a head of the sealing member being retained by the retaining ring.

5. A pipe socket part as claimed in any or more of the preceding claims, wherein the retaining ring is cast and moulded after the sealing member has been positioned and thus fills said chamber completely.

6. A pipe socket part as claimed in any or more of the preceding claims, wherein the retaining ring cooperates with the outer side of the final widening of the socket.

7. A method of accommodating a sealing member in a pipe socket part, wherein after positioning a part of a sealing member in an annular recess, an in situ polymerisable plastics resin composition is cast and moulded which composition forms a rigid retaining ring for retaining the sealing member.

8. A method as claimed in claim 7, wherein a polymerisable composition is cast being able to polymerize to a plastics resin at low temperatures, preferably at ambient temperature, preferably a polyurethan resin.

9. A method as claimed in claims 7 or 8, wherein after having positioned a part of a sealing member in an annular final widening of the socket pipe part, a chamber is formed for receiving a liquid or flowable polymerisable composition, said chamber being subsequently filled by casting a polymerisable composition into said chamber.

10. A method as claimed in claims 7 to 9, wherein the annular recess for positioning the part of a sealing member and for forming the retaining ring, is formed by means of a mould which cooperates sealingly with the sealing member and with the socket, preferably a mould which cooperates sealingly with the free end of the final widening of the socket and with the sealing member.

11. A method as claimed in claims 7 to 10, wherein the retaining ring extends upon the inner side of the final widening of the pipe socket part.

12. A method as claimed in claim 11, wherein the retaining ring extends across the free end of the socket pipe part and the outer side of said socket pipe part.

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